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Authors are requested to make none but typographical corrections on the proof sent to them. The manuscript must represent the final form in which the article is to be printed.

PHYSIOLOGICAL.

SOME OF THE INFLUENCES WHICH AFFECT THE POWER OF VOLUNTARY CONTRACTION.

Warren P. Lombard, M.D. (Jour. of Physiol., February, 1892). This paper, by an American physiologist, represents one of the substantial contributions made to science during the past few years. No better abstract can be made of the subject than to give an epitome of the summary as stated by the author.

The amount of fatigue experienced by the central muscular apparatus in producing a long series of voluntary muscular contractions does not correspond with the number of times that the muscle is stimulated, at least when the rate is not more than once a second. It appears to depend rather on the strength of the impulse sent out, because the total height to which a given weight can be lifted by such a series of contraction is a much more accurate expression of the condition of the central mechanisms than the number of times that the muscle can be contracted. Further, the fatigue of this central apparatus does not correspond with the amount of conscious effort expended in the work, for very many maximal voluntary contractions can be made without fatigue, provided the weight is small. Indeed, it would seem as if the strength of the impulses sent outward to the muscle depended, not only on the voluntary effort, but on some influence which passed inward from the muscle itself.

The following influences were observed to lessen the ability to do voluntary muscular work: 1st. General and local fatigue. 2d. Hunger. 3. Lessening atmospheric pressure, including the regular and irregular variations. 4th. High temperature, especially if associated with much humidity. 5th. Tobacco.

Those which increase the ability to do voluntary muscular work are: 1st. Exercise. 2d. Rest, and especially sleep. 3d. Food. 4th. Increasing atmospheric pressure, including regular and irregular variations. 5th. Alcohol.

Exercise acts in the same direction as sleep and food, and is a very potent factor in increasing the ability to do voluntary muscular work. While the two last mentioned act to restore the strength, exercise increases the power. Sleep has a much greater effect than food and is much more beneficial than waking rest. A rising barometer favors the action of food, sleep and exercise to increase the power, while a falling barometer opposes them, and may overcome their influence and lessen their strength.

In the writer's individual experience the action of tobacco and alcohol was very marked. Alcohol in small doses increases the strength markedly, even when the barometer is rapidly falling. Tobacco may prevent the effect of a rising barometer or of food from showing itself, and seems even to lessen the strengthening effect of exercise, the effects of these two substances, therefore, seemingly neutralizing themselves. The influences of both were very temporary, and the statement in reference to alcohol is based on the use of small quantities.

J. C.